

**A NEW SPECIES OF *APHELINUS* (HYMENOPTERA: APHELINIDAE)  
THAT PARASITIZES THE SPIREA APHID, *APHIS SPIRAECOLA*  
PATCH (HOMOPTERA: APHIDIDAE)**

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*Abstract.* — A new species of an aphid parasitoid, *Aphelinus spiraecolae* Evans and Schauff (Hymenoptera: Aphelinidae) is described and figured. This species is parasitic on the spirea aphid, *Aphis spiraecola* Patch, and is being investigated for possible use in a biological control program against the spirea aphid and other citrus aphids including the brown citrus aphid, *Toxoptera citricida* (Kirkaldy). The new species is very similar to *Aphelinus gossypii* and characters to differentiate it from related species are given.

*Key Words:* Parasitoid, biological control, citrus, citrus tristeza virus

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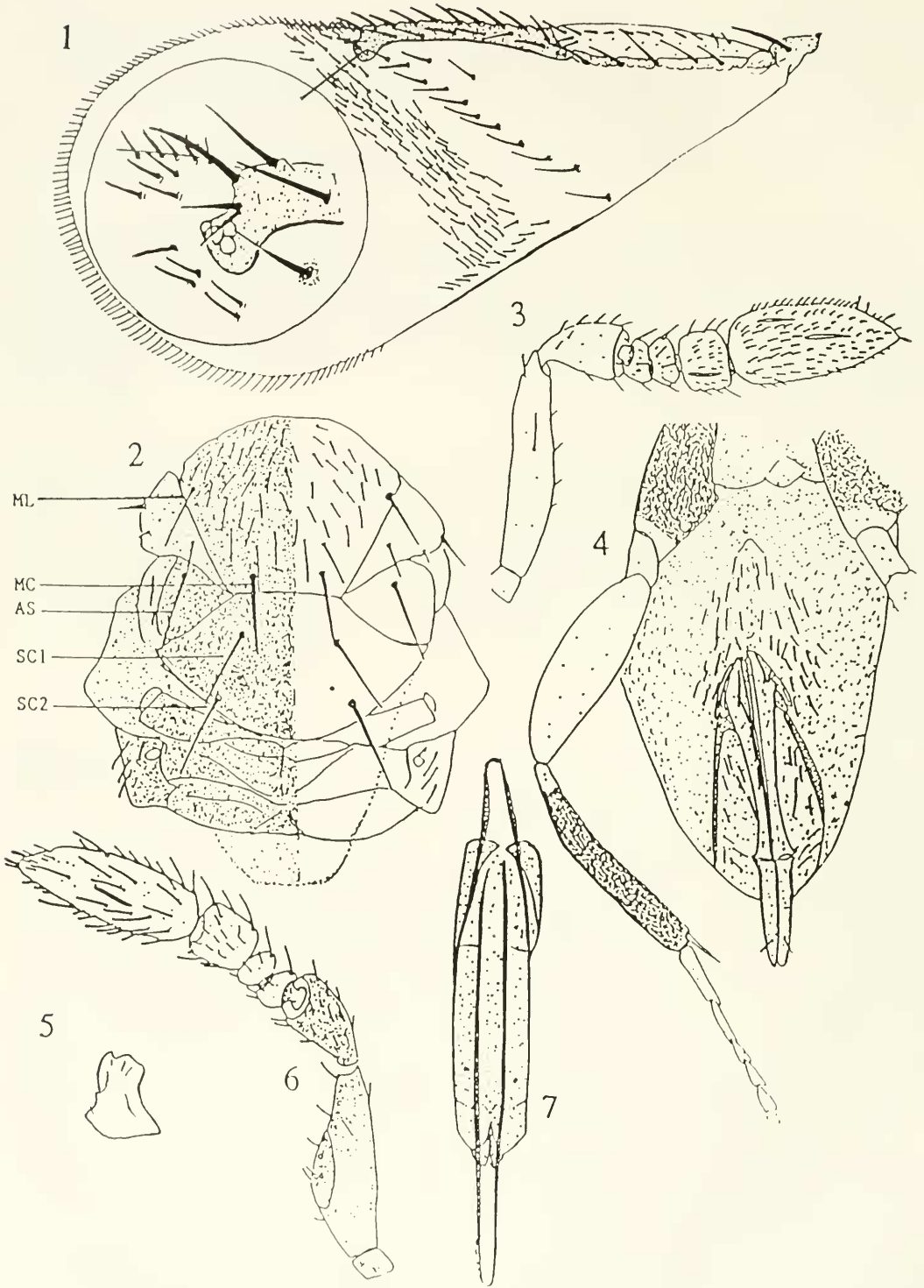
During 1992, collections of aphid parasitoids from citrus were made in four provinces of the People's Republic of China namely, Sichuan, Hunan, Fujian, and Guangdong. Some of the emerging parasitoids collected from the Guangzhou area (Guangdong Province) were brought to Florida for study as potential biological control agents of citrus aphids.

This research was undertaken because the brown citrus aphid, *Toxoptera citricida* (Kirkaldy), the most efficient vector of citrus tristeza virus has spread throughout the Caribbean Basin except the Bahamas (Yokomi et al. 1994) and is likely to be introduced into the continental U.S. in the foreseeable future. This aphid generally attacks only citrus and citrus relatives and is thought to be native to Asia where citrus originated. Because the aphid has potential to cause major damage to citrus, research is under way to

find control measures that would suppress the aphid population and mitigate the damage.

The species described in this paper was originally believed to be *Aphelinus gossypii* Timberlake, a common, widespread parasite of the melon or cotton aphid, *Aphis gossypii* Glover, and related aphids. However, investigation of the biology of the species from China revealed differences between it and that of *A. gossypii* including its ability to attack the spirea aphid, *Aphis spiraecola* Patch (Yokomi et al. 1993). Further examination revealed characters that were different from those of *A. gossypii* and we are, therefore, proposing a new species name for this taxon.

The importance of this new species is due to its potential as a biological control agent of the spirea aphid which has few effective parasitoids in the United States (Cole 1925,



Figs. 1-7. *Aphelimus spiraeocolae*, female except Figs. 6, 7: 1, fore wing, disk setae excluded and stigmatal vein magnified. 2, thorax. 3, antenna. 4, gaster (venter) and hind leg. 5, mandible. 6, antenna. 7, aedeagus.

Miller 1929, Tang et al. 1994). The spirea aphid is abundant on citrus worldwide and has a wide host range. It transmits citrus tristeza virus (Yokomi and Garnsey 1987), as well as some potyviruses (Adlerz 1987).

*Aphelinus spiraecolae*

Evans and Schauff, NEW SPECIES

Figs. 1–7

Diagnosis. — Head and thorax dark brown; legs yellow except dark brown coxae and hind tibiae; gaster dark brown with yellowish base; F1 and F2 broader than long, F3 quadrate; costal cell of fore wing with two lines of ventral setae, area proximal to lineal calva bordered by one complete row of 13–16 setae and one incomplete row of 2–5 setae.

*Female:* Length, 0.95–1.2 mm (Holotype, 0.98 mm). *Color:* Head and thorax dark brown, legs yellow except dark brown coxae and hind tibiae; gaster dark brown with base (terga I) yellowish; endophragma fuscous; third valvulae pale with dark brown lateral margins; antennae light brown; wings hyaline. *Structure:* Head dorsum about as broad as thorax; mandibles bidentate (Fig. 5) with an internal tooth, a blunt middle tooth and a truncation; lateral ocellus separated from eye margin by one ocellus diameter; occiput reticulate. Antenna (Fig. 3) with short radicle; scape about 4 to 5.5 times as long as broad; pedicel (ventral length) less than 2 times its width; F1 annuliform, with ventral margin longer than dorsal margin; F2 broader than long, as long as F1; F3 quadrate, about 2 times longer than F2 with one linear sensillum; club 2.4 times longer than broad, about 3 times longer than F3 with 6–7 linear sensillae and 7–8 papillae. Thorax (Fig. 2) with fine reticulations; mid-lobe of mesoscutum with two pairs of primary setae and approximately 40 setae, primary setae MC (posterior central) short, as long as ML (anterior lateral) setae, and axillar setae (AS), reaching base of SC1 setae; each side lobe with 2–3 setae; scutellum with

2 pairs of black setae, placoid sensillae small and widely separated, with pale, diamond-shape markings around each; endophragma short, about 0.7 times as long as the length of the thorax; tibial spur of middle leg slightly shorter than corresponding basitarsus; hind tibia with 7 conspicuous conical setae at apex, tibial spur of leg III about one-half as long as corresponding basitarsus. Fore wing (Fig. 1) broad, more than 2 times as long as wide (0.8:0.36 mm); costal cell 1.2 times longer than marginal vein and with 20–25 ventral setae in 2 rows and 11–13 dorsal setae; submarginal vein with 5–6 setae; marginal vein with 9 setae along the margin, all about 1.5 times longer than width of marginal vein; basal cell bare; stigmal vein short with stigma rounded; area proximal to lineal calva bordered by one complete row of 11–15 setae and one incomplete row of 1–5 setae; marginal fringe very short, less than 0.05 times as wide as fore wing disc; ciliation dense after the lineal calva. Gaster (Fig. 4) longer than thorax (0.56:0.35 mm); ovipositor (0.35 mm) inserted at middle of gaster, only slightly exerted distally, longer than hind tibia (0.29 mm) and mid tibia (0.21 mm); third valvulae (0.12 mm) one-third the length of entire ovipositor.

*Male:* Length (0.88–0.92 mm): Similar to female except central portion of femur II and tibia II slightly infuscate; radicle, scape and pedicel brown (Fig. 6); scape with 3 round sensoria and club with 2 linear sensillae; abdomen tapering distally; aedeagus as shown in Fig. 7.

Material examined. — Holotype female, Fushan City, Guangdong Province, P.R. China, VII 1992, ex *Aphis spiraecola*, R. Yokomi, deposited in the Institute of Zoology, Academy of Sinica, Beijing, P.R. China. Paratypes (19 ♀♀, 11 ♂♂) with same data as holotype. Paratypes deposited in: U.S. National Museum of Natural History, Washington, D.C.; Florida State Collection of Arthropods, Gainesville, Florida; The Natural History Museum, London, En-

gland; Canadian National Collection, Ottawa and the Collection of M. Hayat, Aligarh, India.

Known distribution.—Guangdong Province, P.R. China.

Comments.—*Aphelinus spiraeocolae* is placed in the *Aphelinus* subgenus of the genus *Aphelinus* as defined by Hayat (1990). This species is similar in body color and fore wing ciliation to species placed by Zehavi and Rosen (1988) in the *Aphelinus mali* group (*Aphelinus campestris* Jasnosh, *A. gossypii* Timberlake, *A. mali* (Haldeman), *A. paramali* Zehavi & Rosen, and *A. prociphili* Carver). However, it differs from the species in this group by the color of the legs. The femora of the middle legs of all of the *mali* group species are dark brown. The legs of the *A. spiraeocolae* female are entirely yellow except for its dark brown coxae and hind tibia. While differences in body color may be useful in discriminating different *Aphelinus* species, these differences alone may not always provide conclusive evidence to distinguish different species. Janssen (1961) and Michel (1969) reported considerable intraspecific variation in the color of the body (and legs) of *Aphelinus asychis* Walker (= *semiflavus* (Howard)) and *A. chaonia* Walker, respectively. Given this variation and the fact that species groups are not well justified nor widely used in this genus, we are not assigning *A. spiraeocolae* to a species group at this time.

Of the species mentioned above, *Aphelinus spiraeocolae* is most similar to *A. gossypii* (Timberlake) in coloration, shape and ciliation of the fore wing, and antennal structure. However, in *A. gossypii* the femora and tibiae of the fore and middle legs and basitarsi of the hind legs of females are dark brown. The MC setae are elongate, reaching the placoid sensillae (shorter and not reaching placoids in *spiraeocolae*); and the setae along the marginal vein are about 2 times as long as the width of the marginal vein (setae 1.5 times longer than width of marginal vein in *spiraeocolae*).

*Aphelinus spiraeocolae* is also similar to *Aphelinus chaonia* Walker. This species has a wide distribution and host range. It was introduced into California by Flanders and Fisher (1959) from South China for the control of the black citrus aphid, *Toxoptera aurantii*, and propagated in the laboratory on the spirea aphid. These two species can usually be easily distinguished from each other by the color of the legs. Normally, the femora of the fore and middle legs of *A. chaonia* are dark brown. However, the legs are yellowish in the light form of *A. chaonia*. Nevertheless, *A. chaonia* can be distinguished by the greater number of setae (more than 20) along the proximal border of the linea calva of the fore wing (less than 20 setae in *spiraeocolae*) and the dark base of the gaster (base of gaster yellow in *spiraeocolae*).

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